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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER	
DHINGRA, RAKESH KUMAR	
ART UNIT	**PAPER NUMBER**
1763	

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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/619,731	RENKEN, WAYNE GLENN	
	Examiner	Art Unit	
	Rakesh K. Dhingra	1763	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *03* MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *15 July 2003*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-29* is/are pending in the application.

4a) Of the above claim(s) *16 and 17* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-15 and 18-29* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) *1-29* are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *31 October 2003* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *10/03, 2/04, 6/04*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Election/Restrictions

Restriction to one of the following inventions is required under 35 U.S.C. 121:

I. Claims 1-15, 18-29, drawn to apparatus, classified in class 118, subclass 725.

II. Claim 16-17, drawn to method, classified in class 428, subclass 715.

The inventions are distinct, each from the other because of the following reasons:

Inventions I and II are related as process and apparatus for its practice. The inventions are distinct if it can be shown that either: (1) the process as claimed can be practiced by another materially different apparatus or by hand, or (2) the apparatus as claimed can be used to practice another and materially different process. (MPEP § 806.05(e)). In this case the apparatus as claimed can be used for processing a non-semiconductor workpiece.

Because these inventions are distinct for the reasons given above and have acquired a separate status in the art as shown by their different classification, restriction for examination purposes as indicated is proper.

During a telephone conversation with Gerald P Parsons on 6/17/05 a provisional election was made without traverse to prosecute the invention of Group I, claims 1-15, 18-29. Affirmation of this election must be made by applicant in replying to this Office action. Claim 16-17 withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.

Information Disclosure Statement

The information disclosure statement filed 10/3/2003 fails to comply with the provisions of 37 CFR 1.97, 1.98 and MPEP § 609 because it should be on form PTO-1449 instead of PTO-892. It has been placed in the application file, but the information referred to therein has not been considered as to the merits. Applicant is advised that the date of any re-submission of any item of information contained in this information disclosure statement or the submission of any missing element(s) will be the date of submission for purposes of determining compliance with the requirements based on the time of filing the statement, including all certification requirements for statements under 37 CFR 1.97(e). See MPEP § 609 ¶ C(1).

Drawings

1) The drawings are objected to under 37 CFR 1.83(a) because they fail to show the arrangement for opening and closing and varying the rate of opening/closing of Upper housing 104 and lower housing 134 as described in the specification (paragraph 0028). Figures 6-8 only show the arrangement for moving Upper Temperature Control Element 124. Any structural detail that is essential for a proper understanding of the disclosed invention should be shown in the drawing. MPEP § 608.02(d). Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the

appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

2) The drawings are also objected to because of following:

In Figure 4 – Reference Numbers 132 and 133 refer to same part.

Specification

The disclosure is objected to because of the following informalities:

1) Paragraph 0028, line 1 reads "Mechanical assembly 102 drives the opening and closing of SPC 100", whereas as per Figures (4, 6-8) the mechanical assembly 102 has been shown to actuate plate 124. It is suggested to clarify this.

2) Paragraph 0035, line 6 – It is suggested to replace Reference number 134 with 132.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1, 4, 5, 10, 11, 13, 18, 19, 23, 25 are rejected under 35 U.S.C. 102 (b) as being anticipated by Ohkase et al (US Patent No. 6,111,225).

Regarding Claim 1: Ohkase et al disclose an apparatus 2 (Figures 1, 2) comprising:

a first temperature controlled plate 8 (upper heating vessel);

a second temperature controlled plate 14 (holder) comprising proximity pins 14A (claws), the wafer W located between the first and second temperature controlled plates and distanced from the second temperature controlled plate by the proximity pins 14A; and an enclosure 4 surrounding the first and second temperature controlled plates and the wafer, the enclosure comprising a gas input 30 and output 34, the gas flowing from the input past the wafer and to the output (Column 4, lines 5-50).

Regarding Claim 4: Ohkase et al disclose a flow distribution manifold 28 configured to distribute the gas upon the wafer W (column 5, lines 34-42).

Regarding Claim 5: Ohkase et al teach the flow distribution manifold 28 comprises laminar flow paths 32, each laminar flow path comprising a laminar flow element controlling the flow rate of said flow path (Column 5, lines 34-42 and Column 7, lines 50-58).

Regarding Claim 10, 13: Ohkase et al teach the apparatus comprises a gas output flow and exhaust regulator system (Figure 5 and Column 5 lines 33-43, Column 6, lines 28-65).

Regarding Claim 11: Ohkase et al teach an apparatus 2 (Figures 1, 2) comprising:

a first temperature control element 14 (holder);

a gas distribution system 28 configured to distribute gas at different points about

a surface of the wafer W, the gas distribution system comprising a plurality of flow paths 32, each of the plurality of flow paths comprising a laminar flow element, wherein the wafer W is located between the gas distribution system and the temperature control element (Column 4, lines 39-50 and Column 5, lines 33-42).

Regarding Claim 18: Ohkase et al teach an apparatus comprising:

a first heating plate (Upper heating vessel) 8;

a second heating plate (holder) 14;

the first and second heating plates configured to heat a wafer placed between the plates, the wafer spaced from the first and second heating plates by proximity pins 14A (Column 4, lines 5-50).

Regarding Claim 19 and 25: Ohkase et al teach that the apparatus comprises a flow control system having distributed gas flow paths 32 and one or more flow control elements 62 regulating the gas flow rate through the gas flow paths (Figures 5, 12 and Column 10, lines 25-65).

Regarding Claim 23: Ohkase et al teach that the apparatus (Figures 1, 2) comprises:

a first means 8 for changing the temperature of the wafer at a first side of the wafer W;

a second means 14 for changing temperature of the wafer at a second side of the wafer; and

a gas distribution means 28 for distributing a gas at a controlled flow rate at a plurality of locations upon the first or second side of the wafer (Column 4, lines 5-50).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1, 2, 4, 10, 18 are rejected under 35 U.S.C. 103 (a) as being unpatentable over admitted prior art in view of Blersch et al (US Patent No. 5,965,047).

Regarding Claim 1: Admitted prior art teaches an apparatus (Figures 1-3) for varying the temperature of a wafer comprising a first temperature controlled plate 32, top and bottom enclosures 20, 40 and gas input 22 (paragraph 0010).

Admitted prior art does not teach second temperature controlled plate comprising proximity pins.

Blersch et al teach an apparatus (Figure 7) with two heating plates (temperature controlled plates) 86 and 88, with plate 88 having pins (proximity) 14 for supporting wafer 12 in position (Column 4, lines 52-55 and column 2, lines 56-60) to irradiate a wafer uniformly from both sides.

Admitted prior art does not explicitly show gas output. However it is an obvious requirement of this type of system.

Blersch et al also teach Vent 62 (gas outlet) for this type of systems.

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to add second temperature controlled plate as taught by Blersch et al in the apparatus per admitted prior art to enable uniform heating of wafer from both sides.

Regarding Claim 2: Admitted prior art teaches first temperature controlled plate 32 with proximity pins 34, the proximity pins configured to distance the wafer from the first temperature controlled plate (Figure 1-3, paragraph 0010).

Regarding Claim 4: Admitted prior art teaches a showerhead 24 (flow distribution manifold) configured to distribute the gas upon the wafer 28.

Regarding Claim 10: Blersch et al also teach that the process gas flow is controlled by computer controlled valves well known in the art (column 2, lines 11-15).

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to use gas flow control as taught by Blersch et al in the apparatus per admitted prior art to enable uniform heating of wafer from both sides.

Regarding Claim 18: Admitted prior art in view of Blersch et al teach an apparatus comprising:

a first heating plate,

a second heating plate;

the first and second heating plates configured to heat a wafer placed between the plates, the wafer spaced from the first and second heating plates by proximity pins.

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to use second heating plate with proximity pins as taught by Blersch et al in the apparatus per admitted prior art to enable uniform heating of wafer from both sides.

Claim 3 is rejected under 35 U.S.C. 103 (a) as being unpatentable over admitted prior art in view of Blersch et al (US Patent No. 5,965,047) as applied to claim 2 above and further in view of Ushikawa (US patent No. 6,140,256).

Admitted prior art in view of Blersch et al teach all limitations of the claim except that the proximity pins are movable.

Ushikawa teaches an apparatus (Figure 1) that has a work table 3 with lifter pins 41-43 that support a wafer W at a process position, to enable heating the wafer in non-contact state from the wafer mount surface 3a and improve planar uniformity (column 4, lines 21-30 and column 2, lines 22-28, lines 57-60).

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to use moveable pins in the second temperature controlled plate in the apparatus per prior art in view of Blersch et al to improve planar uniformity.

Claims 5, 6, 19, 22, 23, 24, 25 are rejected under 35 U.S.C. 103 (a) as being unpatentable over admitted prior art in view of Blersch et al (US Patent No. 5,965,047) as applied to claims 1, 2, 4, 10, 18 above and further in view of Dhindsa et al (US patent No. 6,245,192).

Regarding Claim 5: Admitted prior art in view of Blersch et al teach all limitations of the claim except for flow distribution manifold comprising laminar flow paths with laminar flow elements.

Dhindsa et al teach a gas distribution apparatus 26 (Figure 4) comprising temperature controlled support plate 20, baffle plates 56A, 56B and shower head 22 with gas-

passages 54 to provide uniform pressure across backside of showerhead (column 6, lines 34-36).

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to use gas distribution apparatus as taught by Dhindsa et al in the apparatus of admitted prior art in view of Blersch et al to obtain uniform pressure across backside of showerhead.

Regarding Claim 6: Dhindsa et al teach the laminar flow element comprises gas channel 88 formed in upper surface of showerhead. Dhindsa et al further teach that that the space between lower baffle plate 56B and shower head 22 can have spaced apart annular channels to allow the gases to be selectively controlled for achieving uniform gas chemistry & pressure across showerhead (column 3, lines 19-25).

Regarding Claim 19: Admitted prior art in view of Blersch et al teach all limitations of the claim except for flow control system with distributed gas flow paths.

Dhindsa et al teach a gas distribution apparatus 26 (Figure 4, 5) comprising temperature controlled support plate 20, baffle plates 56A, 56B and shower head 22 with gas-passages 54 and Flow controllers MFC 1, MFC 2 to regulate gas flow rate through gas flow paths and provide uniform pressure across backside of showerhead (column 6, lines 34-36).

Dhindsa et al further teach that that the space between lower baffle plate 56B and shower head 22 can have spaced apart annular channels to allow the gases to be selectively controlled for achieving uniform gas chemistry & pressure across showerhead (column 3, lines 19-25).

Regarding Claim 22: Admitted prior art in view of Blersch et al teach all limitations of the claim except for flow control system having flow channel plate with flow control elements.

Dhindsa et al teach upper and lower baffle plates 56A and 56B (flow channel plate) having flow control elements 80, 82 formed in these baffle plates and flow controllers MFC 1, MFC 2.

Regarding Claim 23: Admitted prior art in view of Blersch et al teach all limitations of the claim except gas distribution means for distributing gas at a controlled flow rate.

Dhindsa et al teach a gas distribution apparatus 26 (Figure 4, 5) comprising temperature controlled support plate 20, baffle plates 56A, 56B, shower head 22 and flow controllers MFC1, MFC2 for distributing gas at a controlled flow rate at a plurality of locations upon the first or second side of the wafer, to provide uniform pressure across backside of showerhead.

Regarding Claim 24: Blersch et al teach that the temperature of the first or second means 52 or 54 is manipulated for changing the temperature of the wafer 12.

Regarding Claim 25: Admitted prior art in view of Blersch et al teach limitations of the claim except for flow control of gas by the gas distribution means.

Dhindsa et al teach use of flow controllers MFC1, MFC2 (Figure 5) for the controlling flow rate of gas.

Claim 7 is rejected under 35 U.S.C. 103 (a) as being unpatentable over admitted prior art in view of Blersch et al (US Patent No. 5,965,047) and Dhindsa et al (US

patent No. 6,245,192), as applied to claim 5 above and further in view of Nanyei et al (US patent No. 5,580,830).

Admitted prior art in view of Blersch et al and Dhindsa et al teach all limitations of the claim except for laminar flow path with cavity.

Nanyei et al teach an apparatus (Figures 2, 3) that uses an insert 20 to create a restricted aperture 22 in the gas distribution system that reduces impurity concentration in the chamber. Nanyei further teaches that impurities in the chamber are concentrated near aperture and there is little backflow of impurities to the chamber (Column 3, lines 38-60).

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to use restricted aperture as taught by Nanyei et al in the apparatus per admired prior art in view of Blersch et al and Dhindsa et al to minimize backflow of impurities to the chamber.

Claims 8, 9, are rejected under 35 U.S.C. 103 (a) as being unpatentable over admitted prior art in view of Blersch et al (US Patent No. 5,965,047) as applied to claim 4 above and further in view of Or et al (US Patent No. 6,364,949).

Regarding Claims 8, 9: Admitted prior art in view of Blersch et al teach all limitations of the claim except for flow distribution manifold being in contact with temperature controlled plate.

Or et al teach an apparatus (Figure 6) having a gas delivery assembly 149 with a temperature controlled plate 151 in thermal contact with showerhead 153 (flow distribution manifold) to obtain minimum thermal gradient across wafer (column 5, lines

60-65). Or et al also teach that temperature controlled plate 151 includes gas inlet 159 through which gas flows to showerhead 153 and then to wafer 142 (Figure 4 and column 6, lines 11-15).

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to use a gas delivery assembly as taught by Or et al in the apparatus per admitted prior art in view of Blersch et al to obtain minimum thermal gradient across wafer.

Claims 11 is rejected under 35 U.S.C. 103 (a) as being unpatentable over admitted prior art in view of Brors et al (US Patent No. 5,551,985).

Regarding Claim 11: Admitted prior art teaches a device for controlling the temperature of a wafer comprising:

a temperature control element 32; and

wherein the wafer 28 is located between the gas distribution system 24 and the temperature control element 32.

Admitted prior art teaches a gas distribution system 24 configured to distribute gas at different points about a surface of the wafer, the gas distribution system comprising a plurality of flow paths, but it does not teach that each of the plurality of flow paths comprises a laminar flow element.

Brors et al teach an apparatus (Figures 4-7) that has a gas distribution with multiple gas nozzles 152 each having controllable flow rate and velocity and are independently rotatable to maximize the uniformity of gas distribution pattern in order to achieve high uniformity of coating layer (column 5, lines 28-35 and column 6, lines 9-15).

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to use a gas distribution system with laminar flow gas output as taught by Brors et al in the apparatus per admitted prior art in view of Blersch et al to obtain high uniformity of coating.

Claim 12, 13, 14, 15 are rejected under 35 U.S.C. 103 (a) as being unpatentable over admitted prior art in view of Brors et al (US Patent No. 5,551,985) as applied to claim 11 above and further in view of Or et al (US Patent No. 6,364,949).

Regarding Claims 12: Admitted prior art in view of Brors et al teach all limitations of the claim except for gas distribution system being temperature controlled and providing uniform temperature distribution and gas flow distribution across wafer surface.

Or et al teach an apparatus (Figure 6) having a gas delivery assembly 149 with a temperature controlled plate 151 in thermal contact with showerhead 153 (flow distribution manifold) to obtain minimum thermal gradient across wafer (column 5, lines 60-65). Or et al also teach that temperature controlled plate 151 includes gas inlet 159 through which gas flows to showerhead 153 and then to wafer 142 (Figure 4 and column 6, lines 11-15).

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to use a gas delivery assembly as taught by Or et al in the apparatus per admitted prior art in view of Brors et al to obtain minimum thermal gradient across wafer.

Regarding Claim 13: Admitted prior art in view of Brors et al teach all limitations of the claim except exhaust.

Or et al teach that the apparatus has an exhaust system whereby reaction products are exhausted from chamber under the influence of negative pressure provided by a vacuum pump 255 (Figure 4 and column 9, lines 60-62 and column 5, lines 45-50). Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to use a gas exhaust system as taught by Or et al in the apparatus per admitted prior art in view of Brors et al to obtain minimum thermal gradient across wafer.

Regarding Claim 14: Admitted prior art in view of Brors et al teach all limitations of the claim except that gas delivery assembly includes temperature control plate.

Or et al teach that the apparatus the gas delivery assembly 149 includes temperature control plate 151 (column 4, line 30-34).

Regarding Claim 15: Admitted prior art in view of Brors et al teach all limitations of the claim except that gas distribution system and the temperature control element can be adjusted to different temperatures in order to vary the temperature gradient within the device.

Or et al teach that the gas distribution system and the temperature control element can be adjusted to different temperatures in order to vary the temperature gradient within the device (column 5, lines 64-68).

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to use a gas delivery assembly with adjustable as taught by Or et al in the apparatus per admitted prior art in view of Brors et al to vary temperature gradient across the wafer.

Claim 20, 21 are rejected under 35 U.S.C. 103 (a) as being unpatentable over admitted prior art in view of Blersch et al (US Patent No. 5,965,047) and Dhindsa et al (US patent No. 6,245,192) as applied to claim 19 and further in view of Or et al (US Patent No. 6,364,949).

Regarding Claims 20, 21: Admitted prior art in view of Blersch et al and Dhindsa et al teach all limitations of the claim except flow control system in contact with first heating plate.

Or et al teach an apparatus 149 (Figure 6) wherein the flow distribution manifold 153 is in thermal contact with the first heating plate 151 to obtain minimum thermal gradient across wafer (column 5, lines 60-65).

Or et al also teach that temperature controlled plate 151 includes gas inlet 159 through which gas flows to showerhead 153 and then to wafer 142 (Figure 4 and column 6, lines 11-15).

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to use a gas delivery assembly as taught by Or et al in the apparatus per admitted prior art in view of Blersch et al and Dhindsa et al to obtain minimum thermal gradient across wafer.

Claims 26, 27, 28 are rejected under 35 U.S.C. 103 (a) as being unpatentable over admitted prior art in view of Blersch et al (US Patent No. 5,965,047) and in view of Liu et al (US Patent No. 6,753,506).

Regarding Claims 26-28: Admitted prior at in view of Blersch et al teach all limitations of the claim (as explained above under the paragraph for Claims 1, 2, 4, 10, 18) except the

system operable to vary a rate of closure of any of the first or second temperature altering devices or the enclosure to adjust the temperature of the wafer.

Liu et al teach an apparatus (Figures 1, 2) with a work piece enclosure which moves within heating chamber 11 as desired to subject the work piece to different heating levels, to enable reduce purge time and improve throughput (Column 3, lines 30-38). Liu et al further teach a positioning assembly 22, and lid 33 (upper portion) that move to close the enclosure by contacting base 34 (lower portion) when it is in elevated position in the heating chamber 11 (Figure 1 and column 5, lines 35-45 and column 14, lines 13-18).

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to use operation of enclosure as taught by Liu et al in the apparatus per admitted prior art in view of Blersch et al to improve throughput.

Claims 29 is rejected under 35 U.S.C. 103 (a) as being unpatentable over admitted prior art in view of Brors et al (US Patent No. 5,551,985) and in view of Liu et al (US Patent No. 6,735,506).

Regarding Claim 29: Admitted prior art in view of Brors et al teach all limitations of the claim (as explained above under claim 11) except the device operable to adjust the rate of opening and closing

of the enclosure by varying one or more rates of movement of the first or second enclosing structures.

Liu et al teach an apparatus (Figures 1, 2) with a work piece enclosure which moves within heating chamber 11 as desired to subject the work piece to different heating

levels, to enable reduce purge time and improve throughput (Column 3, lines 30-38). Liu et al further teach a positioning assembly 22, and lid 33 (upper portion) that moves to close the enclosure by contacting base 34 (lower portion) when it is in elevated position in the heating chamber 11 (Figure 1 and column 5, lines 35-45 and column 14, lines 13-18).

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to use operation of enclosure as taught by Liu et al in the apparatus per admitted prior art in view of Blersch et al to improve throughput.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Kaltenbrunner et al (US Patent No. 5,872,889) teach an apparatus 1-6) that has a closable enclosure with a base 100 and lid 110 that is filled with process gas surrounding wafer 10, resulting in reduced temperature inhomogeneity and improved throughput (column 3, lines 15-25).

Kholodenko (US Patent No. 5,900,064) teaches an apparatus (1,2,6-8) with a focus ring 90 for directing flow of process gasses 110 on to surface 30 of substrate 12 to provide uniform distribution of reactive gas species across wafer and to remove process gas by-products from the plasma zone above the substrate (Column 8, lines 57-63).

Akimoto (US Patent No. 6,097,005) teach an apparatus (Figure 1) that has a first heating/cooling plate 3, means 5 for raising/lowering of a second cooling plate 4 to vary its distance from wafer W, to improve throughput.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Rakesh K. Dhingra whose telephone number is (571)-272-5959. The examiner can normally be reached on 8:30 -6:00 (Monday - Friday).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Parviz Hassanzadeh can be reached on (571)-272-1435. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Rakesh K Dhingra

Parviz Hassanzadeh
Supervisory Patent Examiner
Art Unit 1763